

REMARKS/ARGUMENTS

The rejection under 35 USC § 112

Claim 19: The words “inter alia” have been deleted.

It is respectfully submitted that this amendment fully addresses the rejection made by the Examiner.

The rejections under 35 USC § 103

Claims 1-19, 22, 25, 26 and 28-32 were rejected under 35 USC § 103 as being unpatentable over Hussam (US 2003/0050927) in view of Ryall (US 6,774,899).

- The disclosure of the present application concerns the canonicalization (putting into standard form) of a RDF graph that includes anonymous or blank nodes (which are well understood terms in the art). If there were no blank nodes, then the process set out at the bottom of page 10 of the application could be used to:

- canonicalize literals;
- write the graph as triples (e.g.: subject node label, predicate edge, object node label);
- lexographically sort the triples.

However, the above process is unsatisfactory if the RDF graph includes blank nodes; the present disclosure seeks to improve matters by distinguishing blank nodes from each other in a deterministic manner and then labelling the nodes accordingly thereby to permit them to be sorted lexographically. Blank nodes can be distinguished from one another by looking at the surrounding features of the graph (that is, features reached over edges connected to the node).

“Easy blank-node labelling”

Because a blank node may be surrounded by other blank nodes, it may be necessary to go some way out before one blank node can be distinguished from another. Nevertheless, if one was prepared to look far enough outward from a blank node, it would always be possible to distinguish one node from another by its connected features. However, this is not desirable due to the computational effort involved, so the present invention limits how much of the surrounding graph is looked at to distinguish two blank nodes. This is explained at page 7, line 3 to page 8, line 11.

This limitation on processing is referred to in claim 1 in respect of the “first rules”. In the preferred embodiment, the limit is set by only looking one remove from a blank node of interest, that is, to nodes at the end of the edges anchored to the blank node of interest.

The labelling of blank nodes by a limited look at the surrounding graph shall be referred to as: “easy blank-node labelling” herein.

Nodes which are still not labelled after “easy blank-node labelling” are called “hard-to-label nodes” in the present application (see page 7, line 23).

The process described at the bottom of page 11 and on page 12 of the present application, includes “easy blank-node labelling” though it is not called that therein. In brief, after canonicalization of literals and the writing of the graph as triples (steps 1-3), blank nodes are all labelled the same, namely “~” though a blank node’s old identifier is kept in a comment (steps 4, 5). The triples are then ordered (6). The file is then gone through, line by line and lines which are the same as the line above or below are skipped (step 7a) – this means that if two triples starting with blank nodes, cannot be distinguished by their object node labels, the triples are skipped. It is this feature that, in this embodiment, limits the extent of looking at connected features to distinguish

blank nodes. Where a triple with a blank node is not skipped, the blank node is distinguishable and a sub-process is carried out by which the node is labelled with a number (this is covered by the remainder of steps 7 and 8). Finally, the triples are ordered again (step 9). The blank nodes that have not been labelled (the so-called “hard-to-label” nodes) will be grouped together in the skipped triples.

Dealing with the “hard-to-label” blank nodes.

The specification proposes at least two ways of dealing with the “hard-to-label” blank nodes. One way is simply to delete them (see page 14, line 8). Another way is to add distinctive triples in order to make sure that none of the nodes are hard to label (see page 15, line 1).

The Claim Amendments

Independent Claim 1

This claim is cast in terms of first, second and third ‘sets of rules’. The appropriate mapping between the steps described above and the claim 1 rule sets is as follows (though not every step is specifically mentioned in the claims):

First Rule Set:

- Canonicalization of strings
- Writing RDF graph as triples (a representation of the graph)
- ordering of triples
- “easy blank-node labelling”

Second Rule Set

Modifying the "hard-to-label" blank nodes

Third Rule Set

Re-ordering of triples (possibly with "easy blank-node labelling")

Claim 1 has been amended to move "easy blank-node labelling" from the second rule set to the first rule set where it clearly belongs, the first rule set already referring to setting a limit on the extent of processing carried out (a feature of "easy blank-node labelling"). In addition, claim 1 now limits how this "easy blank-node labelling" is done by reciting:

"the processing in accordance with the first set of rules further including assigning a different respective label to those blank nodes that are determined, by a limited examination around each node, to be distinguishable from the other blank nodes by their respective connected features of the graph, the assignment of the labels to these blank nodes being based on an ordering dependent on the connected features that distinguish them"

This is an important feature. The "limited examination" is, in the exemplary embodiments, only looking at the names of directly connected nodes as explained above with reference to page 7, line 3 - page 8, line 11 (this limitation stopping exponential growth in processing that would occur if any remoteness of nodes were allowed to be examined in the course of looking for a distinguishing feature).

A few other changes have been made to claim 1; in particular, each 'wherein' clause about the rule sets now refers to the processing brought about by the rule set rather than to the rule set itself. Additionally, the limitation

"wherein the second set of rules include assigning a label to each of a number of the plurality of blank nodes and modifying the portion of the blank nodes remaining unlabelled"

has been amended to better comport with the disclosure of the invention.

Finally, with respect to claim 1, it should be noted that where claim 1 (and other claims) refer to the first rule set:

“ordering the representation, the plurality of blank nodes being substantially omitted from the ordering process;”

this doesn’t mean that the triples (the representation of primary interest) which include blank nodes are omitted – indeed, it is important for the described embodiment discussed above that such triples are included in the ordering process. What the quoted wording is intended to mean is that in ordering the triples, blank nodes in the triples are effectively ignored (in the embodiment discussed above, the blank nodes are all labelled “~”).

Claims 5 & 7

As claim 1 refers to a RDF graph, claim 5 is redundant and therefore it has been cancelled (and claim 6 dependent on it is now dependent upon claim 1). Claim 7 is superfluous in view of the amendments made to claim 1.

Claim 15 and New Claim 33

Claim 15 has been amended to make it clear that when the blank nodes that are labelled, are labelled differently from one another. New claim 33, dependent upon claim 15, includes language similar to that which is added to claim 1 by this amendment.

Independent Claims 19 & 22

These claims have been amended to generally correspond to the amendments made to claims 1 and 15 discussed above.

Independent Claim 25

This claim has been amended in a way generally corresponding to the amendments made to claim 1 discussed above.

New Claims 33 & 34

Proposed new claim 33 has already been mentioned above in relation to independent claim 15. Regarding new independent claim 34, this claim is a broader version of amended claim 1 and concentrates on the “easy blank-node labelling” feature.

The Prior Art

Hussam (US2003/0050927) appears to have been cited simply as a disclosure of RDF; it apparently adds nothing beyond standard RDF knowledge.

Ryall (US 6,774,899) discloses a software tool for manipulating graphs displayed on a computer screen – see Figure 2. A number of buttons 120 down the right of the screen enable user-selected nodes of the displayed graph to be automatically manipulated in various ways. Buttons 140 down the left of the screen allow other operations such as labelling the nodes.

The Examiner asserts that it would be obvious to use the Ryall tool to manipulate an RDF graph in the ways specified in the rejected claims to better present the graph.

Ryall discloses ordering nodes using button 131 or 132 (see column 3, lines 44-46) and labelling nodes using button 143 (see column 3, line 32).

After reading the present disclosure, it would appear to be possible for a human operator to use Ryall's tool to carry out the method of claim 1, though certain steps would need be implemented mentally (such as, for the amended form of claim 1, examining connected features of the graph around each blank node).

However, there is no teaching or suggestion in Ryall that would lead a reader to use the Ryall tool in such a way as to carry out the method of claim 1 in respect of an RDF graph. A human user using the Ryall tool to canonicalize an RDF graph is likely to effect a complete labelling of the blank nodes without (i) leaving some unlabelled and (ii) then modifying the representation of the RDF graph in respect of the unlabelled nodes (labelling a blank node is not a modification, in terms of the data represented by the RDF graph). Ryall contains no teaching about how to label blank nodes and, in particular, nothing corresponding to the detail of the second rule set now included in amended Claim 1.

Another fact which the Examiner glosses over is that the method of claim 1 requires certain steps to be carried out in sequence. Thus, claim 1 requires:

- "ordering the representation, the plurality of blank nodes being substantially omitted from the ordering process";
- Labelling a number of the blank nodes;
- Modifying the remaining, unlabelled, blank nodes; and
- Re-ordering the presentation

While this application of steps could be carried out using the Ryall tool with the aid of the present disclosure, there is no teaching in Ryall about preceding in this manner. A human using the Ryall tool would, for example, label the blank nodes before using the node sequencing feature of Ryall.

The Examiner has therefore failed to establish that the claims are obvious over Hussam and Ryall.

Reconsideration is requested

Withdrawal of the rejections and allowance of the claims are respectfully requested.

The Commissioner is authorized to charge any additional fees which may be required or credit overpayment to deposit account no. 08-2025. In particular, if this response is not timely filed, then the Commissioner is authorized to treat this response as including a petition to extend the time period pursuant to 37 CFR 1.136 (a) requesting an extension of time of the number of months necessary to make this response timely filed and the petition fee due in connection therewith may be charged to deposit account no. 08-2025.

I hereby certify that this correspondence is being electronically filed United States Patent and Trademark Office on

12 September 2008
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